APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,409	10/19/2001	Baback Moghaddam		6231

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Patent Department
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EXAMINER
CHAWAN, SHEELA C

ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.		Applicant(s)
Office Action Summary	10/087,409		MOGHADDAM, BABACK
	Examiner		Art Unit
	Sheela C Chawan		2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 October 2001*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10- 13* is/are rejected.

7)☒ Claim(s) *9 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some *　c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Drawings Objection

1.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference sign 21 is not shown in fig 3b as described in discloser at page 8, line 4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2.   Claims 1, 6, 9 and 14 are objected to because of the following informalities:

In claim 1, line 10, " a similarity score for the reference record " should be corrected to " a similarity score that the test record matches the reference record ", to be consistent with the specification disclosure for the claimed invention (see abstract and page 4, line 16).

The formula in claim 9, line 2 is not a distance function, but is the weight function W_i (see page 9, lines 1-5).

Furthermore, in claim 9, N should be defined (number of extracted

features in test record), and D should be defined (distance function).

In claim 14, line 3, change " S (T, F) " should be corrected to S (T, R).

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically

disclosed or described as set forth in section 102 of this title, if the differences

between the subject matter sought to be patented and the prior art are such that

the subject matter as a whole would have been obvious at the time the invention

was made to a person having ordinary skill in the art to which said subject matter

pertains. Patentability shall not be negatived by the manner in which the

invention was made.

Claims 1- 5 and 7- 8, are rejected under 35 U.S.C. 103(a) as being unpatentable

over Lin et al., (US. 6,763,127 B1), in view of Riganati et al., (US. 4,135,147).

As per claim 1, Lin discloses a method for comparing features (features

correspond to ridge minutia, column 1, line 63) of a test record (column 2, lines 45- 47)

with features of a reference record (column 1, lines 63-67, column 2, lines 1-20), each

feature having a location and orientation (column 1, lines 63- 67, column 2, lines 1- 47),

comprising;

determining a weight for each feature of the reference record (for each minutia

point in the reference image a Gaussian weight function is applied, column 2, line 67

through column 3, line 2);

aligning (align test image and reference image by selecting minutia points in two

finger prints image, column 1, lines 33- 35, column 2, lines 48- 59) the features of the

test record with the features of the reference record (align the test and the reference

images for comparison, column 2, lines 48- 59);

summing the weights (Gaussian weight function is applied to each minutia point

in the reference image, column 3, line 67 through column 3, line 1 – 2) of all features of

the reference record that are less than a predetermined difference when compared with

the features of the test record to determine a similarity score for the reference record

(summing the weights of each minutia point by applying Gaussian –based scores are

combined, column 3, lines 3-26).

Lin is silent about specific details of measuring differences between the locations

and orientations of the features of the reference record and the features of the

test record.

Riganati discloses a minutiae pattern identification system. The system

comprises of:

measuring differences between the locations and orientations (measuring the

similarity between two patterns, where each pattern has been described by a set of

minutia and each minutia is described by its position and orientation, column 2, lines 32-

50) of the features of the reference record and the features of the test record (fig 1 and

fig 2, column 6, lines 4 - 57, column 10, line 54 through column 11, line 29).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time of the invention to modify Lin to include measuring differences between the

locations and orientations of the features of the reference record and the features of the

test record. It would have been obvious to one of ordinary skill in the art at the time of

the invention to have modified Lin by the teaching of Riganati in order to provide the set

of match scores, developed from the pair of fingerprints being compared, is analyzed

from a global or overall view point by a score processor which produce more accurate

results of numerical measure the degree of similarity between the pair of fingerprints

being compared (as suggested by Riganati at column 2, lines 32- 50, column 42, lines

3- 31).

As per claim 2, Lin discloses the method further comprising:

comparing (column 2, lines 45- 59) the features of the test record with a plurality

of reference records to determine a plurality of similarity scores (column 3,lines 1-23);

and

selecting a particular reference record as a candidate reference (column 2, lines

50- 59) record if the corresponding similarity score is greater than a maximum threshold

(fig 1, column 1, lines 55- 62).

As per claim 3, Lin discloses the method further comprising:

extracting the features from images of fingerprints (column 1, lines 45- 46).

As per claim 4, Lin discloses the method of wherein the alignment is a rigid transformation including global translation and rotation (column 2, lines 21- 43).

As per claim 5, Lin discloses the method wherein the alignment is a rigid transformation including only global translation to approximately align the features of the test record with the features of the reference record (column 2, lines 21- 59).

As per claim 7, Lin discloses the method further comprising:

measuring differences only between pairs (column 2, lines 48- 59) of features that are approximately aligned (column 3, lines 3-18).

Regarding claim 8, Lin discloses an apparatus and method for fingerprint recognition system for identifying, for each feature in the reference record, a local neighborhood of features (column 2, lines 48- 59); and

Lin does not explicitly disclose function of distance between each feature and the local neighborhood of features. However, Riganati discloses a minutiae pattern identification system. The system comprises of:

setting the weight (column 5, lines 41-53) of each feature proportional to a function of distances between each feature and the local neighborhood of features (column 8, lines 29- 46, column 11, lines 16- 29, column 18, lines 20- 52).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lin to include function of distance between each feature and the local neighborhood of features. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Lin by the teaching of Riganati in order to provide an automatic system which is more accurate for producing a

match of two images where each relative information vector is derived from local

features of an image (as suggested by Riganati at column 3, lines 27- 30).

4.   Claims 6, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Lin et al., (US. 6,763,127 B1), in view of Riganati et al., (US. 4,135,147), as applied to

claims 1- 5 and 7- 8, above and further in view of Edgar et al., (US. 6,487,321 B1).

Lin discloses an apparatus and method for fingerprint recognition system. Lin is

silent about specific details of probability of matching features is represented by a zero

mean Gaussian function f $(0;\sigma^2)$, where; σ^2 is a variance of the function.

Edgar discloses an image processing and more particularly to a method and

system for altering defects in a digital image. The system comprises of:

a probability (column 8, line 51 through column 9, line 9) of matching features is

represented by a zero (column 7, lines 6- 53, column 8, lines 10-23, column 9, lines 10-

23) mean Gaussian function f $(0;\sigma^2)$, where;σ^2 is a variance of the function (column 11,

lines 15-39).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time of the invention to modify Lin to include a probability of matching features is

represented by a zero mean Gaussian function f $(0;\sigma^2)$, where; σ^2 is a variance of the

function. It would have been obvious to one of ordinary skill in the art at the time of the

invention to have modified Lin by the teaching of Edgar in which alteration in the image

is done substantially with little or no damage to the underlying image because, filter

pixel of the digital image and the pixel weight is based upon the expected reliability of

each pixel area of strong defect are more easily excised without causing significant

damage to the area surrounding the defect (as suggested by Edgar at column 2, lines 3-22).

As per claim 10, Edgar discloses the method wherein the distance function is an arithmetic mean (column 6, line 48 through column 7, line 5).

As per claim 11, Edgar discloses the method wherein the distance function is a geometric mean (column 6, line 48 through column 7, line 5).

As per claim 12, Edgar discloses the method wherein the distance function is maximum distance (column 6, lines 48 through column 7, line 5, column 7, lines 27- 53).

As per claim 13, Edgar discloses the method wherein the sum of the weights of the features of the reference record is normalized to one (column 9, lines 10-23).

Allowable Subject Matter

5.   Claims 9 and 14 would be allowable if rewritten to overcome the objection set fourth in this office action and to include all of the limitations of the base claim and any intervening claims.

Other prior art cited

6.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sasakawa et al., (US.6, 229,922 B1) discloses method and apparatus for comparing incoming data with registered data.

Chang et al. , (US.5,572,597) discloses fingerprint classification system.

Jojic et al., (US.6,785,419 B1) discloses system and method to facilitate pattern recognition by deformable matching.

Bolle et al., (US.6,597,802 B1) discloses system and method for generating a rolled surface representation from a set of partial images.

Prokoski (US.6,173,068 B1) discloses method and apparatus for recognizing and classifying individuals based on minutiae.

Contact Information

7.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305- 4876. The examiner can normally be reached on Monday - Thursday 6 - 7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 703-308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S ce

Sheela Chawan
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Group Art Unit 2625
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